REMARKS

Claims 1, 5-9, 11-14 and 17-25 are pending in the application and stand rejected under 35 U.S.C. §§ 102(b) and 103. Applicant respectfully submits that the preceding Amendment and the following Remarks remove all grounds for rejection of the application, thereby placing it in condition for allowance.

Amendments to the Claims:

Claims 1, 5-9, 11-14, 17-19 and 25 have been cancelled. Cancellation of these claims is without prejudice, without intent to acquiesce in any rejection of record, and without intent to abandon any originally claimed subject matter.

Claims 20-24 have been amended to more specifically define the claimed invention. The preamble of each claim now refers to a "golf mat" instead of "artificial turf". This amendment finds support throughout the application (e.g., see page 2, lines 15-21; page 3, lines 19-22 and the Figures). The claims have also been amended to clarify that *some* but not necessarily all of the fibers that protrude from the substrate need to have color changing properties. This amendment is also supported by the specification (e.g., see page 3, lines 22-23). Finally, claim 20 has been amended to clarify that a *polymeric* component of the fibers is responsible for their color changing properties. This amendment finds support *inter alia* on page 6, lines 1-4.

Claims 26-31 have been added. Claim 26 finds support throughout the original application (e.g., see page 2, lines 3-4; page 4, line 22 to page 5, line 20; page 6, lines 1-4; page 7, lines 17-20; and the Figures). Claim 27 finds support on page 3, line 24 to page 4, line 13. Claim 28 finds support on pages 6-7. Claim 29 finds support on page 7-10. Claim 30 finds support on page 7, line 19 to page 8, line 4. Claim 31 finds support *inter alia* on page 6, line 13 to page 8, line 4 and page 10, lines 7-17.

Rejections in view of Shibahashi:

The Examiner has rejected claims 1, 5, 7-9, 11, 12 and 17-20 under 35 U.S.C. § 102(b) as being anticipated by Shibahashi (US Patent No. 4,681,791). The Examiner has also rejected claims 6 and 21-23 under 35 U.S.C. § 103(a) as being unpatentable over Shibahashi and claims

13, 24 and 25 as being unpatentable over Shibahashi in view of Johnson (US Patent No. 5,394,824). Claims 1, 5-9, 11-13, 17-19 and 25 have been canceled and claims 20-24 have been amended. Applicant respectfully submits that Shibahashi does not anticipate amended claim 20 and does not render obvious amended claims 21-24 (alone or in combination with Johnson).

Claim 20

With respect to claim 20 the Examiner argues that:

> "[...] the fiber element of Shibahashi is inherently capable of elastic elongation because for example, as indicated in column 9, line 26, the carpets, rugs or mats are cited as textile materials wherein the fiber element is inherently capable of being elastically elongated when being impacted by feet. It should be noted when the mat or the rug is impacted by the foot it will inherently have an elastic elongation and the impact will provide the temperature of that specific impacted area of the mat to rise and this will cause the color of the impacted area." (see page 4 of Office Action)

Applicant respectfully disagrees. As amended, claim 20 relates to a golf mat with fibers that include a *polymer* that responds to an elastic elongation by changing from a relaxed color to an elongated color. Thus, claim 20 clearly specifies that *polymers* are responsible for the color change. Exemplary polymers having these so-called "stress chromic" properties are discussed on pages 6-7 of the specification. Dependent claims 21-23 (discussed below) refer to fibers that include the "stress chromic" polymer poly(diacetylene). Shibahashi does not teach fibers that include such *polymers*. Instead, Shibahashi teaches fibers that are coated with thermochromic *pigments* (e.g., see Abstract and Summary of the Invention). Thus, in Shibahashi, pigments not polymers, are responsible for the color change. Since Shibahashi does not teach each and every limitation of claim 20 it cannot anticipate claim 20. MPEP § 2131.

Besides, even if this "polymer" vs. "pigment" distinction did not exist, Applicant respectfully points out that Shibahashi *does not* describe a mat (let alone a *golf* mat) with fibers that respond to an elastic elongation by changing from a relaxed color to an elongated color. Rather, the Examiner *hypothesizes* that *if* the fibers in Shibahashi were elongated, they *might* respond elastically, they *might* heat up, and the increase in temperature *might* cause the thermochromic pigments that are coated on the fibers to change color. Nothing in Shibahashi suggests that this will occur; it is the Examiner's invention. Further, even if the Examiner is

correct about each of her suppositions, it is well established that the *possibility* that a result or characteristic could exist in the prior art is *not* sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993). In order to establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). For all of these reasons, withdrawal of the rejection as applied to claim 20 is respectfully requested.

Claims 21-23

With respect to claims 21-23 the Examiner argues that:

> "At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to use poly(diacetylene) because Applicant has not disclosed that the use of poly(diacetylene) provides an advantage, is used for a particular purpose, or solves a states problem. [...] Therefore, it would have been an obvious matter of design choice to modify Shibahashi's reference to obtain the invention as specified in claims 21-23." (see page 6 of Office Action)

Applicant respectfully disagrees and submits that the advantages and purposes of using poly(diacetylene) in the present invention are clearly disclosed. On pages 6-7 of the specification, Applicant discloses that poly(diacetylene) is a *stress chromic* polymer (i.e., a polymer that responds to an elastic elongation by changing from a relaxed color to an elongated color). As depicted in the Figures, the stress chromic properties of poly(diacetylene) are advantageous in the present invention since they cause the stretched fibers of the inventive golf mat to change color when impacted with a golf club head. Thus, on its face the Examiner's argument cannot stand.

Besides, the Examiner's suggestion that a skilled person would treat the substitution of a stress chromic polymer such as poly(diacetylene) for Shibahashi's thermochromic pigments as "an obvious matter of design choice" finds no support in Shibahashi. Shibahashi teaches methods for preparing textiles that are useful because they change color in response to *temperature* changes (e.g., see column 1, lines 5-15). Substituting the thermochromic agents

with a *stress chromic* agent would therefore destroy the only utility that is taught by Shibahashi. This result clearly teaches away from the Examiner's proposed substitution. In addition, Shibahashi's invention is specifically and explicitly designed to alleviate a problem that is associated with *pigments*. Indeed, Shibahashi explains that limiting the size of the pigment particles prevents pigments from "bridging" between fibers (e.g., see column 2, lines 11-53). By solving this problem, Shibahashi is able to improve the distribution of pigments and thus color uniformity across the textile (e.g., see column 2, lines 54-60). A skilled artisan would understand that the teachings of Shibahashi are specifically designed for textiles that include pigments and would not therefore be motivated to substitute the pigments with polymers. For all of these reasons, withdrawal of the rejection as applied to claims 21-23 is respectfully requested.

Claim 24

With respect to claim 24 and the secondary reference of Johnson (discussed below), Applicant respectfully points out that the deficiencies of Shibahashi described in the previous sections are not remedied by Johnson. Indeed, in rejecting claim 24, the Examiner relies on Johnson solely to teach certain elements added in this dependent claim, specifically the inclusion of indicia for determining the position of a golf ball. Since at least one limitation of claim 24 is not even taught or suggested by the combined references (as discussed above and below), the rejection of claim 24 under 35 U.S.C. § 103(a) cannot stand. Applicant therefore respectfully requests that the Examiner also withdraw this rejection.

Claim 26-31

Applicant further submits that Shibahashi does not anticipate or render obvious new claims 26-31. First, as noted above, Shibahashi does not provide any teaching or suggestion of a *golf mat*, as recited in claim 26. Rather, Shibahashi describes various soft, typically woven (see, for example, column 5, lines 41-45, and continuing through column 7, line 51) materials that are *coated* with a thermochromic substance and are useful in the preparation of clothing, bedding, interior ornaments, or outdoor articles (column 9, lines 13-36). The Examiner hypothesizes that Shibahashi's materials, which change color in response to environmental temperature change, will also change color in response to violent stress (e.g., impact with a golf club head), as does

the recited mat. However, nothing in Shibahashi teaches or suggests that this would be the case. The Shibahashi articles are not designed to withstand violent impacts. In fact, it might be expected that the thermochromic coating would break down or come off upon impact. Indeed, the material itself might well tear! There is no teaching or suggestion in Shibahashi of a golf mat as recited in claim 26 comprising protruding fibers with sufficient tensile strength to withstand impact of a golf club head, and with appropriate characteristics to respond to such impact by changing color.

Furthermore, Applicant respectfully points out that the materials of Shibahashi are specifically designed to achieve *uniform* color change – much is made of the inventive contribution of uniform distribution of pigments, allowing uniform color change across the material (e.g., see column 2, lines 11-36). By contrast, the claimed golf mat is designed for *local* color change, responsive to a local impact rather than an environmental temperature difference.

Dependent claims 27-31 further differentiate the claimed invention from Shibahashi. Claim 27 specifically *excludes* fibers that have been coated with a chromogen. In contrast, the teachings of Shibahashi are explicitly limited to materials with fibers that have been *coated* with a thermochromic chromogen (e.g., see Abstract, column 1, lines 56-60). In fact, as noted above, Shibahashi's invention is designed to solve the "bridging" problem that is uniquely associated with *coated* pigments (e.g., see column 2, lines 11-36). On page 5 of the Office Action the Examiner states that Shibahashi teaches "that the thermochromic pigment could be applied in various ways" citing column 3, line 62+. The Examiner misinterprets Shibahashi. On column 3, lines 59-68 Shibahashi describes methods for *preparing pigments*, not methods *of applying pigments to fibers*. These methods are described on column 6, lines 29-48 wherein Shibahashi lists "dipping, brush coating, spray-coating, roll-coating or a like *coating* technique" as suitable methods. Every single Example that is provided by Shibahashi involves *coating* the pigments onto fiber surfaces using one of these methods (by dipping in Examples 1, 3-5, 7-9, 11-12, 18-21, 23 and 25-27 and by spraying in Examples 2, 6, 10, 22 and 24). Thus, Shibahashi does not teach or suggest the limitation of claim 27.

In claims 28 and 30, the chromogen has stress chromic properties. None of the pigments that are described by Shibahashi exhibit such properties. In claim 31 the chromogen is polymeric. Shibahashi teaches pigments. For all of these reasons, Shibahashi does not teach or

suggest the golf mats recited in claims 26-31.

Rejection in view of Johnson:

The Examiner has rejected claims 1 and 14 under 35 U.S.C. § 102(b) as being anticipated by Johnson (US Patent No. 5,394,824). Claims 1 and 14 have been canceled, the rejection is therefore moot. However, Applicant further submits that Johnson does not anticipate or render obvious pending claims 20-24 or 26-31. Indeed, as discussed during the Interview held September 9, 2004, Johnson does not teach each and every one of the claim limitations. MPEP § 2131.

First, Johnson does not teach a substrate with a plurality of fibers protruding therefrom, let alone a golf mat. Johnson teaches thermochromic sensors that are placed along boundary lines in sports such as tennis (e.g., see Abstract, column 3, lines 1-2, etc.). The thermochromic sensors include a layer that is made of liquid crystal thermochromic material (e.g., see column 3, lines 31-35). This liquid crystal layer is sprayed, screenprinted or painted onto a substrate such as the boundary line of a tennis court (e.g., see column 3, lines 31-35 and cross-sections in Figs. 3 and 4). In arguing that Johnson also teaches that the thermochromic liquid crystals can be applied to fibers the Examiner refers to column 9 (see page 4 of Office Action). This section mentions the use of Johnson's invention in baseball. The Examiner notes:

> "[...] a baseball field has a ground area that could be considered as a substrate and the grass or the artificial turf that usually covers the ground area of a baseball field could be identified as fibers."

Applicant respectfully disputes the Examiner's interpretation of Johnson's "baseball" teachings. Indeed, column 9, lines 9-17 read:

> "For example, the thermochromic sensor 32 could be placed *on a bat* to locate the area of contact where the ball struck the bat and possibly to characterize the speed of impact as shown in FIGS. 5A and 5B. Here a thermochromic sensor 112 is *placed over a bat* 110 and then used to bat a baseball 108. After the ball is struck, a visible color change spot 114 is present in thermochromic sensor 112. This could be used to help baseball players understand where on the bat they are hitting the ball." (*emphasis* added).

Thus, Johnson explicitly teaches that, in the context of baseball, his thermochromic materials could be usefully applied onto a baseball *bat*, not a baseball *field* as the Examiner

seems to suggest. Besides, Applicant cannot see why a skilled person would be motivated to spray the thermochromic liquid crystals of Johnson on the *grassy areas* of a baseball field since Johnson specifically teaches that the liquid crystals are useful as sensors on *boundary lines*. The boundary lines of a baseball field do not have fibers protruding therefrom.

Second, the teachings of Johnson suffer from many of the same deficiencies that were discussed above for Shibahashi. Indeed, not only does Johnson fail to teach fibers that protrude from a substrate, Johnson also fails to teach fibers that include a *polymer* that responds to an elastic elongation by changing from a relaxed color to an elongated color. The only color changing materials that are taught by Johnson are thermochromic liquid crystals (e.g., see column 5, lines 41-57).

Conclusion:

Based on the arguments presented above, it is submitted that the pending claims are allowable over the art of record. Applicant would like to thank the Examiner for her thoughtful comments and careful consideration of the case. Please charge any fees that may be required, or credit any overpayment, to our Deposit Account No. 03-1721.

Respectfully Submitted,
CHOATE, HALL & STEWART

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Limited Recognition Under 37 C.F.R. § 10.9(b)

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